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公告本

363711

7月29日修正
補充

申請日期	84.5.25.
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A4
C4

363711

(以上各欄由本局填註)

發明專利說明書

一、發明 名稱	中文	洗滌式垃圾焚化廠
	英文	
二、發明 創作人	姓名	范滄淵
	國籍	中華民國
	住、居所	台北市羅斯福路二段 101 巷 16~2 號
三、申請人	姓名 (名稱)	范滄淵
	國籍	中華民國
	住、居所 (事務所)	台北市羅斯福路2 段101 巷 6-2 號
	代表人 姓名	

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四、中文創作摘要（創作之名稱：洗滌式垃圾焚化廠）

本創作係有關垃圾焚化廠將含高水份之垃圾混燒的一種改良的新型垃圾焚化廠，本創作由[洗滌設備]，[烘乾設備]及[焚化設備]等三個主要設備所構成，是以既有之技術及其原有之功能將其聯貫起來，作連續之作業，其目的之一；先將垃圾在[洗滌設備]過程中自然分離"不可燃份類垃圾"沉積於初沉槽，然後運往掩埋場，同時也將垃圾中之液體類及臭味混溶於水中，使垃圾水份歸由污水處理，其目的之二；繼而在[烘乾設備]過程中，先將垃圾徹底絞碎，再經遠心分離式脫水機作固液分離，水液回流至[洗滌設備]，垃圾則由烘焙筒翻滾乾燥，使垃圾質變為含熱量甚高可供發電廠之燃料，

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英文創作摘要（創作之名稱：

四、中文創作摘要(創作之名稱:)

其目的之三;烘焙筒之作用是在替代原來焚化爐"預熱床"之功能,可充為焚化爐之燃燒床位,相對地增加焚化爐焚化量,其目的之四;在[洗滌設備],[烘乾設備]兩個過程已去除垃圾中之"不可燃份類"全數及垃圾含水份中之90%水份,如此可減少需焚燒的垃圾量50%(焚化減量),相對可縮建焚化爐主体50%,焚化爐僅執行單純的焚化任務 因此也可簡化爐壁材質,所節省費用供建造[洗滌設備],[烘乾設備]絕對有餘,其目的之五;可解除目前一般焚化廠之一半燒水,一半燒垃圾,容易燒出不良氣體造成二次公害及操作困難的問題,雖然本創作需用大量之水作為洗滌垃圾之用,但洗滌垃圾污水經[洗滌設備]之污水處理裝置處理後,能還原為清水

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英文創作摘要(創作之名稱:)

四、中文創作摘要（創作之名稱：

經過濾消毒後，可不斷循環作洗滌垃圾之用，所以本創作在注滿水於各水池及水槽之後，其日常所需用水與一般焚化廠相同，

（請先閱讀背面之注意事項再填寫本頁各欄）

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英文創作摘要（創作之名稱：

五、創作說明 ()

(一)創作原因：台灣只是一個島，地狹人眾，由於經濟發展生活水準提升及人口自然增加，垃圾量之年增率達 10%以上，傳統之垃圾掩埋處理，已填滿很多掩埋場，不容易尋找到掩埋垃圾之適合土地，而使用中之掩埋場地，也將很快就滿載，已找到作為掩埋場之預定土地，因掩埋垃圾後會影響環境品質，使鄰近之居民不斷抗爭反對，若將垃圾填海會產生二次公害及影響漁業，政府也鑑於垃圾問題越來越嚴重，而從數年前就核定在各縣市作全額補助，興建焚化爐，但事與願違，其主要原因是垃圾含高水分，無法有效率的將垃圾作充分的燃燒，查歐美日等先進國家，各家庭產生之廚餘餛水等廢棄物都在廚房調理槽經絞碎機，絞碎後排放[衛生下水道]，然後集中於污水處理廠，經處理後放流於河川，台灣地區各地幾乎都沒有建設[衛生下水道]，所以廚餘餛水等廢棄物都裝入塑膠袋當做一般垃圾丟棄，更因國人之生活習慣，各家庭每日產生之廚餘餛水等液体廢棄物比先進各國多，致使垃圾含水量高達 49%至 53%，所以焚燒台灣地區垃圾相當於一半燒垃圾一半燒水，換言之，歐美日等先進國家是將廚餘餛水等廢棄物由[衛生下水道]輸運至污水處理廠處理，其他垃圾由焚化廠處理，所以焚化垃圾很順利，到目前為止台灣的垃圾焚化廠都是從歐美日等先進各國引進建造，由於台灣地區之垃圾滲著廚餘餛水，焚化前不容易將它分離，另外因為垃圾臭味很難以人工方式將垃圾預先作分類，只好一併進行混燒，使得焚化效率遠不如先進國家，操作困難頻仍，本國廠商退卻，無法本土化，因此如何將焚化廠改良為一種(1)能適應含高水分之垃圾質，(2)能降低建廠成本，(3)能提高垃圾處理量，(4)能簡化操作技術及降低操作費

五、創作說明 ()

用, (5) 能不產生二次公害, 淨化環境消除鄰近居民不安與抗爭, 就是當前興建新焚化廠之要務, 也就是本創作爲上述需要而改良之"洗滌式垃圾焚化廠"之起因

(二) 本創作之目的: 本創作係有關垃圾焚化廠之一種改良, 目前之焚化廠均將所有之垃圾作混燒之處理, 但由於台灣地區各地幾乎都還沒有建設[衛生下水道], 所以垃圾中含有廚餘餒水等, 其含水份高達 49%~53%, 再加上沒有作垃圾分類, 使現有的焚化爐作全程作業時既龐大又沒效率, 操作要高技術, 高費用, 且不易保持爐溫, 燃燒速度遲緩, 容易燒出不良氣體, 建廠費用高, 本創作的目的就是在解決上述的缺點; 第一目的; 先將垃圾中的石頭金屬等類物質排除, 再將垃圾中的水分以污水處理方式處理, 垃圾中的可燃部份再歸焚化處理, 第二目的; 本創作可降低建廠費用, 簡化日常維修操作及費用, 且增加處理垃圾量

(三) 本創作之構成; 由[洗滌設備][烘乾設備][焚化爐設備]等三主要設備所組成, 這些設備都是申請前既有之技術且組合後其原有功能均如常, 只是將各該功能聯貫起來成爲一貫作業, 使原由焚化爐單獨之垃圾處理作業分爲三部

[洗滌設備], 是將垃圾中所含不可燃物質(如石頭金屬等類物質)剔除, 並將垃圾中所含水份分離出來, 交由污水處理裝置處理

[烘乾設備], 是將垃圾中所含可燃物質作烘乾處理

[焚化爐設備], 是簡單地, 迅速地完成垃圾焚化作業的裝置, 本創作三主要設備其構成內容如下

(1) [洗滌設備]; 由 1008 包裝袋割破機, 1011 洗滌槽, 1015

(請先閱讀背面之注意事項再填寫本頁)

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五、創作說明 ()

洗滌垃圾水溝, 1005 加壓幫浦, 1013 粗目攔泥機, 1014 細目攔泥機, 1012 洗滌污水溝, 再接上 2000 污水處理裝置, 包含 2012 初沉槽, 2010 污水貯存調整槽, 2020 厭氣消化槽, 2030 活性污泥槽, 2032 終沉槽, 2033 污泥貯槽等所組成,

(2)[烘乾設備]; 由 3051 濾布輸送帶, 3061 絞碎機, 3052 遠心分離式脫水機, 3050 旋轉式烘焙筒等所組成,

(3)[焚化爐設備]; 由 3001 焚化爐, 3002 灰燼貯坑, 3020 發電裝置, 3031 廢氣冷卻鍋爐, 3032 靜電集塵器, 3003 洗煙塔, 3004 抽風機, 3010 煙囪等所組成,

(四)本創作之功效;

1, [洗滌設備]; 當一般拉圾進廠後, 除粗大垃圾經破碎處理直接進入焚化爐外, 其餘垃圾經推鏟機推入 1008 包裝割破機處理, 並將垃圾散落於 1011 洗滌槽, 散落時並以多組水龍頭沖洗之; 因 1011 洗滌槽是向下傾斜, 所以用人量水沖洗時也將垃圾沖往 1015 洗滌垃圾水溝, 此時 (1) 比重大的石砂金屬物質等不可燃份類垃圾在水中往下沉, (2) 垃圾中之液汁水分混溶於水中, (3) 懸浮垃圾在水中漂浮或半沉半浮, 1015 洗滌垃圾水溝上架設有 1013 粗目攔泥機和 1014 細目攔泥機, 把濕淋之 (3) 懸浮垃圾撈起, 以輸送帶送往 [烘乾設備], 而 (1) 之石砂金屬物質等不可燃份垃圾和 (2) 之液汁水分則隨著水流進入 1012 洗滌污水溝, 然後進入 2000 污水處理裝置處理, 在 2000 污水處理裝置中, 石砂金屬物質等不可燃份垃圾流 2012 初沉槽時就自然沉積於槽底, 然後被抽出放置於 2052 沉澱垃圾槽, 再經 2053 電磁裝置回收廢鐵後, 其餘物資直接送往掩埋場掩埋, “不可燃份類垃圾 (垃圾中比重比水大之石砂金屬陶

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五、創作說明 ()

瓷玻璃等類)經洗滌後悉數可從焚化垃圾量減除(本創作焚化減量之第一種功效),在2000污水處理裝置中,混溶於水之液汁及未被1014細目攔泥機撈起之漏網細小的懸浮顆粒流入2010污水貯存調整槽,做水質調整後,進入2020厭氣消化槽,進行消化,其中80%污染物質消化成原有體積10%之污泥,其後三相分離器將污泥留置槽底繼續消化,甲烷氣進入瓦斯槽充作焚化爐之燃料,上澄水則進入2030活性污泥槽進行曝氣,曝氣可分解50%污染物,未分解部份則沉澱於2032終沉槽內成為其污泥,在2020厭氣消化槽的污泥和2032終沉槽內的污泥,再被抽進2033污泥貯槽,經脫水後進3001焚化爐焚化,如此在污水處理過程可減掉混溶於水之液体垃圾量之82%乾量,(本創作焚化減量之第二種功效),上述洗滌污水之水部份,於厭氣消化,曝氣分解後在2032終沉槽成為清水,流經2002過濾,2003消毒後貯存於2001清水貯槽,作為洗滌垃圾之專用水,循環使用,

2,[烘乾設備]:大部份之濕淋之(3)懸浮垃圾由3051濾布輸送帶,送到3061絞碎機將垃圾體內外含有之水分徹底絞出後,進入3052遠心分離式脫水機,作固,液分離,液体部份回流至2000污水處理裝置處理,固体部份(垃圾)進入3050旋轉式烘焙筒,引用焚化爐廢熱將其翻滾烘乾,去除水分,(本創作因以大量水洗滌垃圾,去除臭味,才能於焚化爐外作烘乾作業,將垃圾所含之最後水分蒸發,焚化減量之第三種功效),進入焚化爐之乾垃圾在爐中迅即焚化,在高爐溫情況下容易將垃圾完全燃燒,使灰燼減少,二次公害減少,同時避免一半燒垃圾一半燒水之焚化困難,

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五、創作說明 ()

垃圾經本創作[洗滌設備]及[烘乾設備]處理後,其所需焚化之量僅為原未處理垃圾總量的半數以下,且是乾,鬆容易燃燒之垃圾,相對上可將焚化爐主體縮小 50%以上,另外垃圾中含有之腐蝕物質經[洗滌][烘乾]過程而被消除,因而可簡化焚化爐的造材,連同爐體減半之建設費用,移作[洗滌設備][烘乾設備]之建造費用應尚有很多節餘,(本創作節省建廠成本之第四種功效),

3, [焚化爐設備];由於[烘乾設備]3050 旋轉式烘焙筒之功能與焚化爐之預熱床功能相同,如同在焚化爐體外增建焚化爐之預熱床,本創作雖將焚化爐縮建 50%,但原先之焚化爐內作為預熱之床位現可充作焚燒之用,所以其擁有之燃燒床位與原來之燃燒床位相當,所以處理焚燒之垃圾量可增加(本創作增加處理垃圾量之第五種功效)

本創作使焚化爐不必再燒垃圾之高含水分,所以爐溫自然恆持高溫,自無因爐溫下降而燒出不良氣體產生二次公害(本創作不會燒出不良氣體不產生二次公害之第六種功效),另外,雖然減少了不可燃份類及垃圾含水份超過垃圾總重量半數,但具發熱量之垃圾減少有限,反而因不必再燃燒垃圾中大量水份影響爐溫,所以焚化垃圾產生之熱氣自然增多,利用此熱能之 3020 發電機也隨著增加發電量(售電收入係沖抵焚化垃圾操作費之一部),售電收入增多等於降低焚化操作費用,再加上本創作可將 50%以上之焚化操作費,移作污水處理費,但污水處理費比焚化操作費便宜甚多,兩者相比,本創作可比原來焚化爐之操作費用少(本創作節省操作費用之第七種功效),

(五)本創作可供產業上之利用;

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五、創作說明 ()

1, 依據 85 年 8 月出版[行政院環境保護署統計年報];最近四年台灣地區垃圾性質;化學分析(水分)佔垃圾總量之百分比為
81 年度;51.97%, 82 年度;51.06%, 83 年度;53.21%,
84 年度;48.14%,

不可燃分垃圾類合計 佔垃圾總量之百分比為

81 年度;17.06%, 82 年度;17.06%, 83 年度;13.01%,
84 年度;15.38%

本創作[洗滌設備]之功能為可將不可燃分類垃圾全數減除,[烘乾設備]之功能為可將垃圾含水份減除 90%,則

$$81 \text{ 年度}; 51.97\% \times 90\% + [17.06\% - 17.06\%(51.97\% \times 90\%)] \\ = 55.85\%$$

$$82 \text{ 年度}; 51.06\% \times 90\% + [17.06\% - 17.06\%(51.06\% \times 90\%)] \\ = 55.17\%$$

$$83 \text{ 年度}; 53.21\% \times 90\% + [13.01\% - 13.01\%(53.21\% \times 90\%)] \\ = 54.67\%$$

$$84 \text{ 年度}; 48.14\% \times 90\% + [15.38\% - 15.38\%(48.14\% \times 90\%)] \\ = 52.05\%$$

本創作[洗滌設備]及[烘乾設備]之功能於該四年度之焚化減量可達 52.05%至 55.85%之間,尚有混溶於洗滌水中之液體類垃圾,其由厭氣消化及曝氣分解之部份未包括在內,

2, 依據 85 年 3 月行政院環保署[鼓勵公民營機構興建營運垃圾焚化廠推動方案(核定本)];

表五; BOT / BOX 所需經費總額及各級政府分攤一覽表

(以五座 900 噸 / 日 廠 為例)

每座土地以七公頃, 主体工程費(建設費)40 億元

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另外,行政院環保署核定之操作維護費用為;

每噸: 900 元-售電費 430 元=470 元

以本創作[洗滌式垃圾焚化廠]作為替代之推估;

(1)洗滌設備

A,洗滌裝置 (包括 1008 包裝割破機,1011 洗滌槽,1005 加壓幫浦,1013 粗目攔泥機,1014 細目攔泥機,1015 洗滌垃圾水溝, 1012 洗滌污水溝)

A-1 處理容量:27900 噸 / 日 (6 組@330 噸/槽/30 分鐘)

A-2 型 式:24 小時連續運轉,暗裝水管式洗滌槽及機械式前後並排切割滾輪機,機械式自動攔泥機

A-3 預估工程費用;二千萬元 X 6 組 = 一億二千萬元,

A-4 用地面積; 0.171 公頃 內容為

洗滌槽, 330 噸/高 2 公尺 X 6 組=990 平方公尺

洗滌垃圾水溝,長 20 公尺 X 寬 6 公尺 X6 組=720 平方公尺

用地面積, 990 平方公尺 + 720 平方公尺=0.171 公頃

B,污水處理裝置

B-1 處理容量; 900 噸 X 30 倍 = 27000 噸

B-2 處理型式;24 小時連續運轉,厭氣消化,活性污泥分解連貫式處理,

B-3 處理流程;請參見圖 2,

B-4 預估工程費用; 二萬元 X 27000 噸 = 五億四千萬元,

B-5 用地面積;1.08 公頃 內容為

(請先閱讀背面之注意事項再填寫本頁)

訂

五、創作說明 ()

水槽容積; $27000 \text{ 噸} \times 4 = 108000 \text{ 噸}$

水槽高度; 10 公尺

用地面積; $108000 \text{ 噸} / 10 \text{ 公尺} = 10800 \text{ 平方公尺}$

(2) 烘乾設備

A, 脫水裝置; (包括 3051 濾布輸送帶, 3061 絞碎機, 3052 遠心分離式脫水機)

A-1 處理容量; $900 \text{ 噸} / \text{日}$ (6 組 @ $150 \text{ 噸} / \text{台} \cdot \text{日}$)

A-2 型 式; 24 小時連續運轉,

A-3 處理流程; 濾布輸送帶輸運之淋漓濕垃圾先經 3061 絞碎機擠出浸入垃圾之含水後, 由 3052 遠心分離式脫水機脫水同時由該機兩端分別排出濾液(水分)及固形物(垃圾),

A-4 預估工程費用; $二千萬元 \times 6 \text{ 組} = \text{一億二千萬元}$

A-5 用地面積; 0.12 公頃 內容為

$200 \text{ 平方公尺} \times 6 \text{ 組} = 1200 \text{ 平方公尺}$

B 旋轉式烘焙筒;

B-1 處理容量; $900 \text{ 噸} / \text{日}$ (2 @ $50 \text{ 噸} / \text{筒} \cdot \text{時}$)

B-2 型 式; 24 小時連續運轉, 內裝攪拌及旋轉推進桿,

B-3 處理流程; 脫水後之垃圾入筒即在攪拌翻滾中烘焙, 同時由旋轉桿邊轉邊推出筒外至焚化爐

B-4 預估工程費用; $一千萬元 \times 2 = \text{二千萬元}$,

B-5 用地面積; $600 \text{ 平方公尺} \times 2 = 1200 \text{ 平方公尺}$,

(3) 焚化爐設備;

A 處理容量; $450 \text{ 噸} / \text{日}$ (3 @ $150 \text{ 噸} / \text{爐} \cdot \text{日}$)

B 型 式; 24 小時連續運轉混燒式機械焚化爐,

(請先閱讀背面之注意事項再填寫本頁)

訂

五、創作說明 ()

C 處理流程;請參見圖 1,

D 預估工程費用;二十億元(行政院環保署核定之半數)

E 用地面積;2.5公頃,

本創作推估 900 噸/日. 廠之主体工程費(建設費)及用地為主体工程費;二十八億元 內容為

洗滌設備;一億二千萬元+五億四千萬元=六億六千萬元

烘乾設備;一億二千萬元 + 二千萬元 = 一億四千萬元

焚化爐設備;三十億元

用地面積;六公頃, 內容為

洗滌設備; 0.171 公頃 + 1.08 公頃 = 1.251 公頃

烘乾設備; 0.12 公頃 + 0.12 公頃 = 0.24 公頃

焚化爐設備;2.5 公頃

各設備週邊;(1.251 公頃+0.24 公頃+2.5 公頃) \times 0.5

= 1.9955 公頃

本創作推估 900 噸/日, 廠之操作維護費用為

(乾垃圾^焚化費) + (洗滌污水處理費)[(470 元 \times 450 噸)+(5 元 \times 27000 噸)] \div 900 噸

= 385 元/噸...本創作處理每噸垃圾之費用

本創作與行政院環保署核定"鼓勵興建之焚化廠"之比較

項目	用地面積	主体工程費	操作維護費
900 噸/日.			
環保署核定	7 公頃	40 億元	470 元/噸
本 創 作	6 公頃	28 億元	385 元/噸

五、創作說明 ()

本創作[洗滌式垃圾焚化廠]其優點如下;

- 1,用地面積可減小,
- 2,主体工程費可降低三成,
- 3,日常之操作維護費便宜二成,
- 4,本創作之日常用水量與一般焚化廠之用水量相等;

本創作雖要用 30 倍於處理垃圾量之大量水去洗滌垃圾,但僅於啓廠前注滿污水處理裝置之各水槽及廠內各水池,僅需要大量用水一次,啓廠後與其他焚化廠之用水量相等,並非每日需要大量用水,說明如下;

本創作污水處理裝置所處理之污水來源爲

(以 900 噸/日.廠爲例)

✓ A, 27000 噸之用於洗滌垃圾之清水.

一般垃圾廠;無,

B, 900 噸 $\times 0.5 = 450$ 噸之溶混於洗滌水之垃圾含水量

一般垃圾廠將其噴進焚化爐燒卻,

C, 焚化廠內產生之其他污水(洗地污水,洗煙污水,洗垃圾車污水,員工污水等)

一般垃圾廠經污水處理後排放廠外,

本創作污水處理裝置將上列 A B C 三項污水陸續

流入後處理,然後從 2032 終沉槽還元爲澄

清的處理水,全部經 2002 過濾,2003 消毒後進入 2001

清水貯槽,供爲洗滌垃圾之專用水,雖然水量在各使用及處理過程中有些損耗但每天有 B 項垃圾含水量及 C 項廠內之其他污水的水量之處理水作爲補充水量之一部份,所以本創作之用水量與其他

(請先閱讀背面之注意事項再填寫本頁)

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五、創作說明 ()

焚化廠之用水量無甚差別。

(六) 圖示簡單說明

(1) 圖示 第 1 圖係洗滌式垃圾焚化廠基本處理流程圖。

第 2 圖係垃圾洗滌及烘乾流程圖。

(2) 圖號

1001 地磅 1002 垃圾傾卸區 1005 加壓幫浦
1007 破碎機 1008 包裝割破機 1011 洗滌槽
1012 洗滌污水溝 1013 粗目攔泥機 1014 細目攔泥機
1015 洗滌垃圾水溝 2000 污水處理裝置
2001 清水貯槽 2002 過濾槽 2003 消毒槽
2010 污水貯存調整槽 2012 初沉槽 2020 厭氣消化槽
2021 瓦斯貯槽 2030 活性污泥槽 2032 終沉槽
2033 污泥貯槽 2034 脫水機 2051 沉澱物槽
2052 沉澱垃圾 2053 電磁裝置 2054 晒乾場
2060 不可燃份類垃圾
3000 焚化設備 3001 焚化爐 3002 灰燼貯坑
3003 洗煙塔 3004 抽風機 3010 煙囪
3020 發電機 3031 廢氣冷卻鍋爐 3032 靜電集塵器
3050 旋轉式烘焙筒 3051 濾布輸送帶
3052 遠心分離式脫水機 3061 絞碎機

(請先閱讀背面之注意事項再填寫本頁)

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B8
C8
D8

六、申請專利範圍

1, 一種洗滌式垃圾焚化廠, 係以一個洗滌設備, 一個烘乾設備, 及一個一般垃圾焚化爐設備組合而成; 就是一個將一般垃圾進行焚化前, 先以洗滌過程, 減除石砂塵土, 金屬, 玻璃, 陶瓷等不可燃份類垃圾之焚化量; 繼以烘乾過程, 減除垃圾含有之大量水份, 然後將剩餘之乾燥蓬鬆垃圾進入焚化爐燃燒之新型垃圾處理廠; 當一般垃圾進廠後除粗大垃圾移送破碎處理後直接進焚化爐外, 其餘垃圾悉數推入包裝割破機處理後散落於洗滌槽; 同時十多倍於垃圾量之清水由洗滌槽四壁暗裝之多組水龍頭(出水口)將垃圾沖洗及沖往洗滌垃圾水溝, 垃圾被沖洗後在水中迅即分為(1)比重大之石砂塵土等類不燃燒物往下沉, (2)垃圾所含之液体混濁於水中, (3)半沉半浮或漂浮之懸浮垃圾等三部份; 裝設在洗滌垃圾水溝上之粗細多組之自動攔泥機將流經之懸浮垃圾撈上濾布輸送帶輸往絞碎機及遠心分離式脫水機, 淋濕垃圾經絞碎後可將垃圾所含水份徹底絞出, 繼由遠心分離式脫水機分離固體液体液体(濾液)回流污水處理, 固體(垃圾)送進旋轉式烘焙筒筒內利用焚化爐餘熱將垃圾翻滾烘乾使垃圾乾燥又蓬鬆, 進入焚化爐後很快就起燃, 燃燒垃圾產生之熱氣經廢熱發電利用後, 由廢氣冷卻鍋爐冷卻, 再經靜電集塵器及洗煙塔淨化後從煙囪排放於大氣中, 焚化爐渣俟冷卻後送掩埋場; 尚在洗滌污水中之垃圾流入初沉槽後(1)比重大之金屬, 玻璃, 陶瓷, 石砂塵土等不可燃分

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六、申請專利範圍

類垃圾就沉積於底部，經抽出由電磁裝置回收廢鐵後運往掩埋場；(2)混濁於水之垃圾液體及回流之濾液(洗滌水之污染來源)流經厭氣槽消化及活性污泥槽分解後，於終沉槽成為混濁於水中之液体垃圾乾量 18%之污泥，經脫水後送焚化爐燒卻；處理水即還原為清水經過濾消毒後貯存於清水貯槽再供為洗滌垃圾之用。

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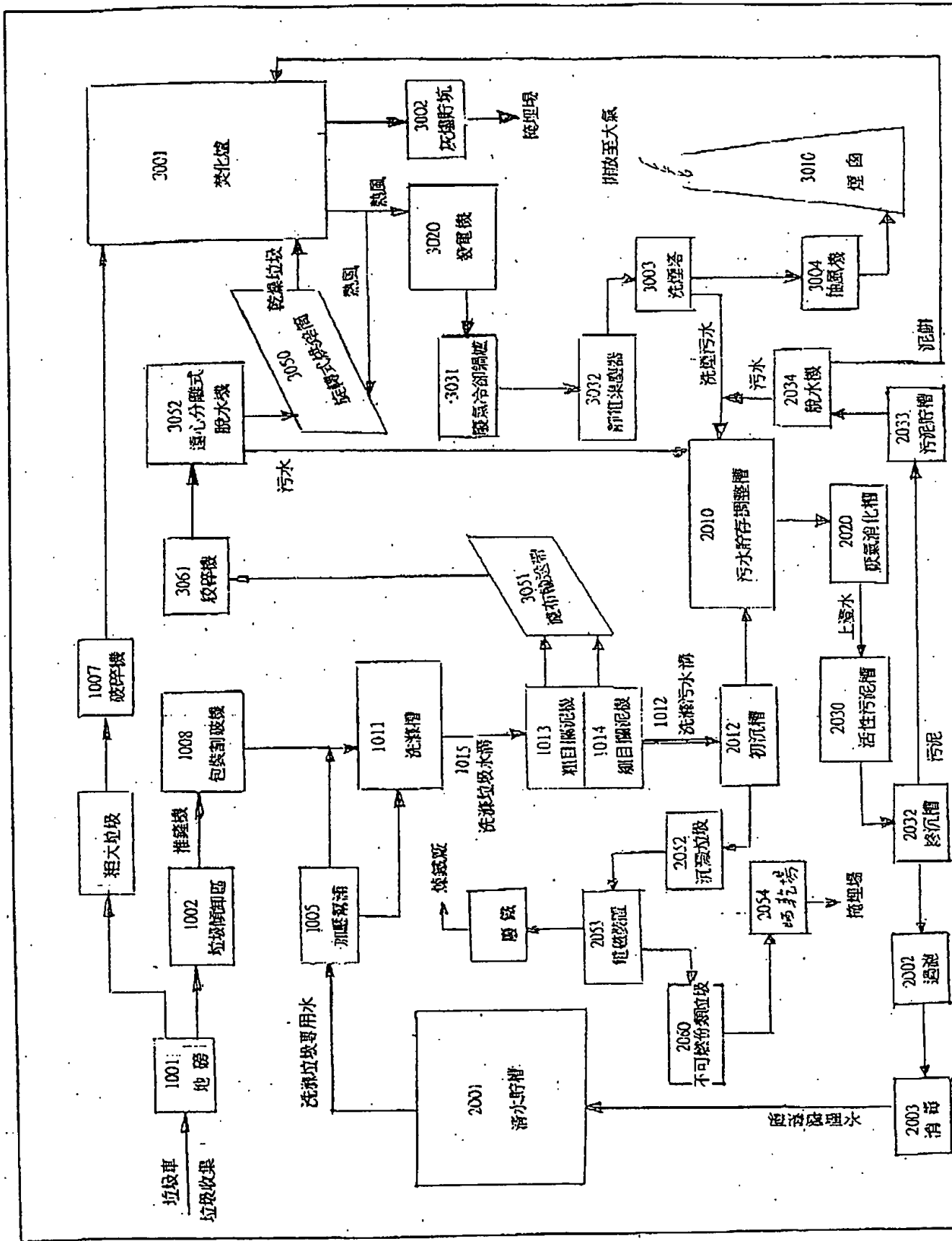
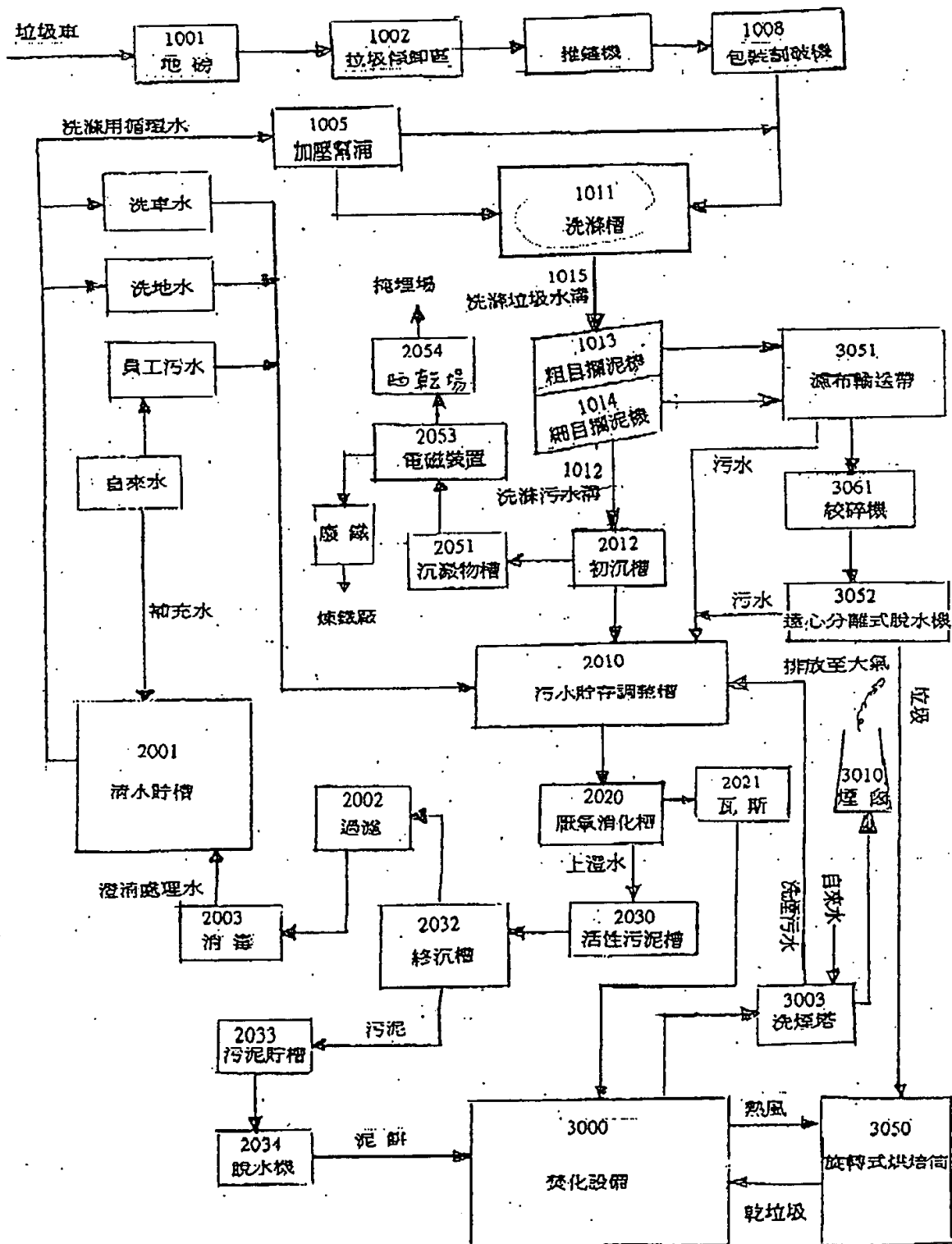
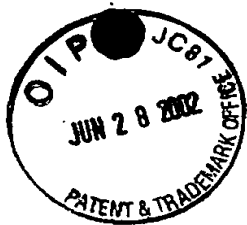


圖 1 洗滌式垃圾焚化廠 基本處理流程





(PARTIAL TRANSLATION)

Translation of Abstract and Efficacy of Taiwan Patent Publication No. 363,711,
Entitled Washing-type waste incinerating plant

ABSTRACT

The present invention relates to an improved waste incinerating plant by mix combustion of waste products having high water content. The waste incinerator of the present invention is composed of three components including a [washing apparatus], a [drying apparatus] and an [incinerating apparatus]. These apparatuses are incorporated to operate continuously based on the existing technologies and functions. It is the first object to settle nonflammable constitutes of the waste product, which are naturally separated during operations of the [washing apparatus], into a primary settling tank and these nonflammable constitutes are then buried in a final disposal place. Meanwhile, the liquid waste and odorous constitutes are mixed with the waste products to be further processed by a sewage disposal. It is the second object of the present invention to crush the waste product completely during operations of the [drying apparatus], and perform a solid/liquid separation by means of a far-centered separatory drier. The separated water is returned to the [washing apparatus]. The waste product is roll-dried by means of a baking cylinder, and the waste product is thus converted qualitatively into a fuel material with a high caloric content. It is the third object to comparatively increase the processing capacity of incinerator since a drum for drying is made to have for itself an effect of a preheating bed of the incinerator and can be used as a burning bed. It is the fourth object to reduce the volume of the waste products to be incinerated down

to 50% (reduction in an incinerating volume) by removing 90% of water content in the most of the “nonflammable constitutes of the waste products” and the waste products having high water content through the processes in the [washing apparatus] and the [drying apparatus]. As the result, the main body of the incinerating apparatus to be constructed can be deduced by 50% in its capacity and further a material for the wall of the incinerator can be simplified since the incinerator is only required to operate for mere incineration. The amount of the savable cost owing to the above is more than enough to cover the cost for the construction of the [washing apparatus] and the [drying apparatus]. It is the fifth object of the present invention to solve the problems such as the generation of the secondary pollution due to harmful gases resulting from incinerating the waste products and the water content half and half by an ordinary incinerating plant day to day, and difficulty in operation of such incinerating plant. The incinerating plant according to the present invention need to use a large volume of water, however sewage after washing the waste products is processed in a sewage disposal apparatus in the [washing apparatus] and can be returned to clean water after filtration and sterilization. Since the water is thus recycled to be used for washing the waste products, a volume of daily required water for the incinerating plant according to the present invention is same as that for an ordinary incinerating plant, once after water having been filled in each of a pond and a water tank.

EFFICACY OF THE INVENTION

1. [washing apparatus]: When typical waste products are introduced, the relatively coarse part are directly sent into the waste incinerator via crushing process. The remainder is sent into a packing cutter 1008 by a shoveling

machine to be processed, and dropped down disorderly to a washing tank 1011. During dropping, this waste product is flushed by multiple water taps. Since the washing tank 1011 is downward inclined, the waste product is sent to a washing waste drain 1015 when flushed by a great amount of water from the water taps. At that moment, (1) nonflammable constitutes with higher specific gravities of the waste product, for example stones, sands, metals, etc., sink in the water; (2) the liquid constitute contained in the waste product is admixed with water; (3) the suspended constitutes float on the water or partially sink in the water. The wetting suspended waste products (3) are scooped up by means of a coarse-mesh sludge-blocking machine 1013 and a fine-mesh sludge-blocking machine 1014 arranged above a washing waste drain 1015, and then transferred to the [drying apparatus] by means of a conveyor belt. The nonflammable constitutes such as stones, sands and metals (1) and the liquid constitute (2) are transferred to a washing sewage 1012 together with water flows, and then sent into a sewage disposal apparatus 2000. In the sewage disposal apparatus 2000, the nonflammable constitutes such as stones sands and metals settle onto the bottom of the primary settling tank 2012 naturally when flowing into there, and then taken out and placed on a sedimentation waste tank 2052. Then, scrap iron therein is collected by means of an electromagnetic apparatus 2053. The remaindering substances are directly sent and buried in a final disposal place. The nonflammable constitutes having higher specific gravities than that of water, for example stones, sands, metals, ceramics, glass, etc., are completely reduced after the washing treatment. (It is the first efficacy of the present invention.) In the sewage disposal apparatus 2000, the liquid constitute which is admixed with water and the tiny suspended particles unscreened by the fine-mesh sludge-blocking machine 1014 flow into a sewage storage adjustment tank 2010, are

subjected to a water quality adjustment therein, and sent into an anaerobic digestion tank 2020 for digestion. Thus, 80% of contaminants are digested into a sludge with 10% volume of the original volume. Subsequently, the sludge is remained on the tank bottom for continuous digestion by means of a three-phase separator. The methane gas is sent into a fuel gas tank and used as a fuel for the incinerator. The supernatant water is sent into an activated sludge tank 2030 for an aeration treatment. The aeration treatment can decompose 50% of the contaminants, and the non-decomposed portion settles in a final settling tank 2032 to be sludge. The sludge in the anaerobic digestion tank 2020 and the sludge in the final settling tank 2032 are pumped into a sludge storage tank 2033, and then incinerated in an incinerator 3001 after dehydration. As a result, 82% of liquid waste products admixed with water are reduced during the sewage disposal process. (It is the second efficacy of the present invention.) The water portion of the above-mentioned washing sewage becomes clear water in the final setting tank 2032 after the treatments of anaerobic digestion and aeration decomposition, then flows through a filter 2002, is subjected to sterilization 2003, and is stored in a clear water storage tank 2001 to be recycled as specified water for washing waste products.

2. [drying apparatus]: Most of the wetting (3) suspended waste products are sent to a crusher by means of a filter cloth conveyor belt 3051. The water contained in the interior and the exterior of the waste product bodies are completely crushed out and sent into a far-centered separatory drier 3052 for solid/liquid separation. The liquid portion after solid/liquid separation is returned into the sewage disposal apparatus 2000. The solid portion (waste product) is sent into a rotary baking cylinder 3050, and roll-dried by employing waste heat from the incinerator to remove water contained therein. (It is the

third efficacy of the present invention to wash waste products and remove odorous material by using a great amount of water, and thus the drying operation can be performed outside the incinerator to evaporate the remaindering water contained in the waste products for the reduction of waste products by incinerating.) The dried waste products are incinerated rapidly after they are sent into the incinerator, and in the case of high furnace temperature, the waste products are easily subjected to a complete combustion. As a result, ash content is reduced and the secondary environmental pollution is lessened. Also, the difficulty for burning waste products with partial water is overcome by such way.

The waste products to be incinerated after the operations of the [washing apparatus] and the [drying apparatus] have a total amount less than a half of the untreated waste products, and they are dry, loose and easily burnt waste products. Relatively, the main body of the incinerator can be shrunk by at least 50%. In addition, the corrosive substances contained in the waste products are removed by the [washing] and the [drying] treatments so as to simplify the building material of the incinerator. Therefore, the cost of the building material and the cost for constructing the main body of the incinerator can be shifted to construct the [washing apparatus] and the [drying apparatus] with a large surplus. (It is the fourth efficacy of the present invention to save construction cost.)

3. [incinerating apparatus]: Since the function of the [drying apparatus] rotary baking cylinder 3050 is similar to that of a preheated bed in the incinerator, such incinerating apparatus can be considered to additionally construct a preheated bed outside the incinerator. Although the size of the incinerator is shrunk by 50% according to the present invention, the preheated bed originally placed in the incinerator can be used for combustion and thus the total size of the preheating beds is substantially comparable to that of the

original preheated bed. Thus, the waste product to be incinerated can be increased. (It is the fifth efficacy of the present invention.)

Since the incinerator of the present invention is not required to burn waste products with high water content, the furnace temperature can be kept at an elevated level naturally. Thus, the secondary environmentally pollution due to combustion at a low furnace temperature can be avoided. (It is the sixth efficacy of the present invention to burn waste products without producing harmful gases and resulting in secondary environmentally pollution.) Furthermore, although the nonflammable waste products and the water contained in the waste products are reduced by at least 50% based on the total weight of the original waste products, the waste products with caloric value is somewhat reduced. However, the hot gases generated from the incinerator is of course increased, because the furnace temperature will no longer be influenced when burning the great amount of water is not necessary. The heat energy is utilized by a generator 3020 to generate electricity increasingly. (The income from selling electricity is employed to balance a part of the operating cost for incinerating waste products). The increasing income from selling electricity means a reduction of operating cost for incinerating waste products, and 50% of the operating cost for incinerating waste products can be shifted as the cost for sewage disposal. Since the cost for sewage disposal is much cheaper than that of operating cost for incinerating waste products, the operating cost of the present incinerator is less than that of the prior art. (It is the seventh efficacy of the present invention to save operation costs.)